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3. Health-Related Restorative Potential of Zingeberaceae Members with Distribution in Meghalaya, India

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3.1 Abstract:

Zingiberaceae is one of the largest families in the plant kingdom with around 53 genera and over 1300 species. Of these, around 80 species are mainly distributed in the eastern Himalayas to southern China, India and in South-east Asia. In India, 22 genera and 178 species were recorded of which 9 genera and 70 species are distributed in South India and 19 genera and 88 species were available in the North-Eastern part of the country.

A total of 13 species belong to 6 genera were recorded from the state of Meghalaya, India whose morphological characters, distribution and their medicinal importance are presented here.

Keywords: Zingiberaceae, Meghalaya, medicinal importance.

3.2 Introduction:

Meghalaya is one of the hilly states located in the North-Eastern region of India. Meghalaya means the "*the abode of the clouds*". The state's capital city of Shillong is popularly known as the "*Scotland of the East*". It comprises of 11 districts viz., East Khasi Hills, West Khasi Hills, South-West Khasi Hills, Ri-Bhoi, East Jaintia Hills, West Jaintia Hills, North Garo Hills, East Garo Hills, South Garo Hills, West Garo Hills and South-West Garo Hills. Most recently, one more district has been added into the list whose headquarters was agreed to be based at Mairang town although formality regarding the same has not been publicly made known to the public by the state government.

Meghalya lies between 25 47''-26 10''N latitude and 89 45''-92 45''E longitude and covers an area of approximately 22,429 square Km. The state is bounded on the north, east and west by the state of Assam and on the south by the country Bangladesh. The *Khasis*, *Jaintias* and the *Garos* communities are the main inhabitants of the State.

The earliest mention of the word "*Khasi*" appeared in Sankardeva's 'Bhagavata purana' composed nearly about 1500 A. D. in the Indo Aryan literature (Grierson, 1907; Gurdon, 1915). The state possesses a rich and diverse plant wealth that is yet to be fully utilized on a commercial scale. Such commercial utilization if done correctly could provide abundant benefit to the tribal farmers of the region. In fact, the region has a great potential for the plantation and commercialization of traditional or otherwise scientifically proven medicinal plants due to its ideal agro-climatic conditions, suitable nature of the soil and abundance of rainfall which are the key determining factors for the diverse arrays of vegetation ranging from tropical and subtropical to temperate or near temperate (Kayang *et al*., 2005; Sanglyne *et al*., 2021 a, b, c).

Medicinal plants are generally known as "*Chemical goldmines*" as they contain natural chemicals, which are acceptable to humans and animals systems. All these chemicals cannot be synthesized in the laboratories. Many secondary metabolites of plants are commercially important and find use in many pharmaceutical companies. Human beings have been dependent on plants for their health care needs since the beginning of civilization. Of the 2,50,000 higher plants species on earth, more than 80,000 are medicinal in nature (Uphof *et al.*, 1959; Singh *et al.*, 2018). Zingiberaceous medicinal plants are generally herbs, often large with a pseudo-stem of convolete leaf sheaths. Leaves are radial or cauline and usually membranous. Flowers are hermaphrodite, irregular, solitary or spicate, bracts membranous. Fruits is loculicidally a 3 valved capsule or indehiscent and membranous or fleshy. Seeds are often arillate, albumen floury and embryo small. Zingiberacea family constitutes a vital group of rhizomatous medicinal plants characterized by the presence of volatile oils and oleoresins of export values. Generally the rhizomes and fruits are medicinal, tonic and stimulant and occasionally they are nutritive. *Curcuma, Zingiber, Alpinia, Hydechium, Kaempferia* and *Costus* are the most common plants of the Zingeberacea family. In the genus *Alpinia, A. galanga* is the most important one which finds varying uses in ayurvedic preparation such as "*Rasnadi powder*". *Costus speciosus* is the only species in the genus *Costus* that is medicinally important. In *Curcuma, C. longa* is the most popular one, which has been studied in greater depth already. *C. aromatica* is used in the treatment of the skin disease. *Kaempferia galanga* have been identified to have tremendous effect in curing bronchial and gastric diseases. Of late, it is being use in the preparation of mouth washes and oral deodorants. *K. rotunda* is another related crops under this genus which has great potential medicinal purposes (Yob et al., 2011).

3.3 Systematic Position of Zingeberaceae Family (Joy et al., 1998):

The systematic position of the zingiberaceae family is as follows:

Kingdom: Plantae
Sub-Kingdom: Phanerogamae
Division: Spermatophyta
Sub Division: Angiospermae
Class: Monocotyydonae
Series: Epigynae
Order: Scitaminales
Family: Zingeberaceae

Zingiberaceae family comprises about 50 genera usually found throughout the warm regions of both hemispheres. Out of these nine genera are reported to constitute potential medicinal plants as listed below.

Genus	Species
Curcuma	*C. amada, C. longa, C. zedoaria, C. aromatica*
Kaempferia	*K. rotunda, K. galanga,*
Hedychium	*H. spicatum, H. coronarium*
Amomum	*A. Subulatum*
Zingiber	*Z. officinale, Z. zerumbet*
Alpinia	*A. galanga, A. calcarata, A. allughas*
Elleteria	*E. cardamomum*
Costus	*C. speciosus*
Gastrochilus	*G. pandurata*

A. *Alpinia galanga* (L) Swartz

Vernacular name: Toral

Morphological Description:

A. galanga is a perennial herb of about 2 m high with lower portion covered with smooth leaf sheaths. The leaves are broadly lanceolate, 30 – 60 cm long and 10 -15 cm broad. The flowers are arranged in erect, terminal panicles composed of numerous spreading dichotomous branching each with two to six, pale greenish white faintly fragrant flowers.

Fruits are oblong, constricted in the middle or even pear shaped, three sided and deep orange red in colour. Seeds are ash colour, three angled and towards the hilum. Both the seeds and rhizomes have pungent aroma (Thakur et al., 1989).

Distribution:

Alpinia galanga is distributed in the tropical areas particularly in South India and North East India such as Meghalaya, Arunachal Pradesh and Manipur. The species occurs naturally in shady and marshy lands.

Medicinal Importance:

The rhizomes and fruits are the main parts of the plants that contain many medicinal properties which is useful against rheumatic pains, sore throat, diabetes, kidney problem, bronchitis. Its rhizomes is mainly utilized in the treatment for digestion and a quick reliever of pain (Grieve, 1971).The extracts of the fruit is also useful for the flatulence, dyspepsia, vomiting and stomach sickness (Cliolino and Yeh, 1999; Mohiuddin et al., 2011) (Figure 3.1, A).

B. *Ammomum aromaticum Roxb*

Vernacular name: Ilashi saw

Morphological Description:

Ammomum aromaticum is an herbaceous plant growing from a rhizomatous rootstock, it produces a cluster of leafy stems usually up to 100 cm tall, though sometimes reaching 200 cm or more. The leaves are oblong, lanceolate, glabrous on both sides. The fruits is ovate, oblong, trigonous and somewhat rugose.

Distribution:

Ammonum aromaticum is widely distributed in the Eastern Himalayas such as India, Nepal and Bangladesh and also distributed in West Bengal and Northeast states such as Sikkim, Meghalaya, Arunachal Pradesh and Nagaland.

Medicinal Importance:

The seeds have antibacterial and stomachic properties. They are also use to treat dyspepsia, flatulence, colic, vomiting, diarrhoea and cough. The seeds are also use to gargle or mouth wash to treat toothache, gingivitis and parodontosis. The rhizome is smashed and made into paste in hot water and taken directly during nausea and vomiting. Young shoots is used as condiment and food flavouring agent (Figure 3.1, B).

C. *Costus speciosus J. Konig ex Retz Smith*

Vernacular name: Sla pangmat

Morphological Description:

Costus speciosus is a succulent, erect, perennial, ornamental, herbaceous plant, root stock tuberous stem, sub-woody at the base, thick creeping rhizome (120 – 300 cm) in height with long lanceolate leaves and white fragment flowers in terminal clusters. It is tall and dramatic landscape plants with large dark green sub-sessile, elliptic or obovate leaves arranged on the stalk in the spiral form. The flower are 5-6 cm long with a cup shaped labellum and a crest yellow stamens. Fruits are red in colour, whereas seeds are black, five in number with a white fleshy aril.

Distribution:

Costus speciosus occurs in the moist and wet evergreen areas of the Indo-Malayan region and Sri Lanka. Within India, C. speciosus occurs throughout the foothills of the Himalayas from Himachal Pradesh to Assam, Meghalaya, Arunachal Pradesh, Vindhya-Satpura hills in central India, Eastern Ghats of Andhra Pradesh and Western ghats of Maharashtra, Karnataka, Tamil Nadu and Kerala.

Medicinal Importance:

Costus speciosus possess many pharmacological activities such as antibacterial, antifungal, antioxidant, anti-inflammatory, analgesic, antipyretic, antidiuretic and estrogenic activity. The rhizomes of C. speciosus contain diosgenin which is the natural source that is used in making drugs as steroidal sapogenin for the synthesis of sex hormones and oral contraceptives. Juice of rhizomes is used for headache and fever, decoction of stem is used for dysentery, diarrhoea, cuts, wounds, antidote, burning sensation, constipation, leprosy, skin disease, asthma, worms, rash, nose pain, vomiting, antivermin and abortion.

The rhizomes of C. speciosus improved digestion and is a stimulants herbs that clear toxins. It also have anti-fertility, anabolic properties. The alkaloid extracts of the rhizomes enhances antispasmodic activities. Rhizomes are also given in pneumonia, rheumatism, urinary disease, jaundice etc. The plants is also used in ear and eye infection and formerly used in Malaysia for small pox. It is used as a cosmetic as eye lashes to increase sexual attractiveness, as mentioned in Kama Sutra (Pawar and Pawar, 2014) (Figure 3.1, C).

D. *Curcuma aeruginosa Roxb*

Vernacular name: Shynrai iong

Morphological Description:

Rhizome of *C. aeruginosa* is large, aromatic, blue in the centre, which is highly variable. Sessile tubers are branched, condensed, root fleshy, ovate, oblong. Leaves is distichous, oblong, lanceolate, tip acute base acuminate, glabrous purple or reddish brown patch along the side of the distal half of the mid rib on the upper side.

Inflorescence is lateral, peduncle about 15 cm long and spike about 13 cm. Flowers in cincinnus of 8 -10 in a bract, equal to or slightly shorter than bracts; corolla is pinkish, labellum yellow with a deep yellow median band.

Distribution:

C. aeruginosa is most widely distributed in South and South-East Asia like Malaysia, Cambodia and Myanmar (Srivilai et al., 2011). In India it is mostly found in Meghalaya, West Bengal, Bihar, Corromondal coast, South Karnataka and in Kerala.

Medicinal Importance:

The rhizomes of *C. aeruginosa* had been used in the treatment of rheumatic disorders, gastrointestinal problems such as diarrhoea and fungal infection. Extracts from the rhizomes have been shown numerous medicinal properties including anti-inflammatory activity, antiviral activity and is also use during childbirth.

The rhizomes are also use to treat body ache and pain. It is also use to treat diabetes and lower the cholesterol and dizziness (Rao and Lamo, 2017) (Figure 3.1, D).

E. *Curcuma angustifolia Roxb*

Vernacular name: Niangsohpet

Morphological Description

C. angustifolia is a rhizomatous, slender branched herb with fleshy cylindrical rhizome and small rootstock. The stems are usually short, replaced by pseudo stems formed by leaf sheats. Leaves are typically simple, distichous, green, glabrous and lanceolate with margins that are entire.

They display fine parallel venation of the central midrib. The flower is perennial and bisexual, epigenous, zygomorphic, funnel shaped flowers within tufts of pink terminal bracts.

The bracts are boat shaped and encased the entire perianth of the flower. The corolla is white, hairy, proximally tubular. The fruit is a capsule, fleshy or dry, dehiscent or indehiscent and sometimes berry like. It has strong rhizome which can grow up to 1.5 m in length.

Distribution:

It is distributed throughout Central, Southern and Eastern India, but most commonly reported from the North East such as Meghalaya and Western coastal plains and hills of India. It is also found in Maharashtra, Andhra Pradesh, Madhya Pradesh, Himachal Pradesh, Odisha, Chattisgarh, Tamil Nadu and Kerala. It is also common in Sri Lanka, Burma, Pakistan, Cambodia, Nepal, North Australia and in China.

Medicinal Importance:

The rhizomes of *C. angustifolia* are typically ground into flour which can then be mixed together with milk or water to form a nutritious meal. Tubers yield starch which is easily digestible and highly nutritious recommended for infants and weak children. It is also an ingredient which is use as a replacement of breast milk or as nutritional supplements for babies a short while after weaning.

The root powder is used with milk to treat difficulty in micturition and urination, fever, gastric reflux disorders and when treat with hot water and honey it is used to treat cough and dyspnea. The tuber powder is also used to reducing intestinal inflammation, carminative, astringent, dysentery, flatulence, cardiotonic.

The root stock is also used as tonic, it is also useful in leprosy, burning sensation, dyspepsia, asthma, jaundice, anaemia, stones in kidney and disease of blood, It is also used for intestinal diseases, pectic ulcers, demulscent, bone fracture and swelling of body.

The essential oils extracts from this plants is used for antifungal, antibacterial, antimycotic and antioxidant activities (Rao and Lamo, 2017; Sharma et al., 2019) (Figure 3.1, E).

F. *Curcuma caesia Roxb*

Vernacular name: Sying iong

Morphological Description:

C. caesia is an erect and rhizomatous herb of about 1 – 1.5 m high and the rhizomes are ovoid in shape, acute at the tip, but not so thick as in other species of curcuma. Leaves are about 30 - 60 cm long and up to 15 cm broad, broadly lanceolate or oblong, glabrous with a deep ferruginous purple cloud down the middle, which penetrates to the lower surface. Leaves arise from the underground rhizome.

Inflorescence is a spike, about 15 cm long or altogether about 30 cm high on a basal peduncle. Flowers are pale yellow, reddish at the outer border and shorter than the bracts. Petioles and sheath are about as long as the blade. Spikes appear before the leaves.

Distribution:

C. caesia is mostly found in sub-tropical to temperate region. It is also found in West Bengal, Madhya Pradesh, Orrisa, Chattisgarh and in Uttar Pradesh. It is also found in Pappi hills of East Godavari, West Godavari, North Eastern states and in Central India.

Medicinal Importance:

The rhizome of *C. caesia* are useful in treating leucodemma, piles, bronchitis, asthma, tumour and tuberculosis gland of the neck, enlargement of the spleen, epileptic seizures, inflammations and allergic eruptions, smooth muscles relaxation, haemorrhoids, leprosy, vomiting, menstrual disorder, inflammation, gonnorheal discharge etc. Traditionally the paste of rhizome is applied on bruises and rheumatic pains. The fresh rhizomes are used to get relief from stomach ache. The paste of rhizome is used for the snake bite and scorpion bite. The fresh rhizome juice is mixed with mustard oil and is given to cattle during dysentery. The roots are grounded into powder and used water to treat gastric disorder (Verma et al., 2010; Rao and Lamo, 2017) (Figure 3.1, F).

G. *Curcuma decipiens Dalzell*

Vernacular name: Chymitba

Morphological Description:

C. decipens is rhizomatous herb, its rhizome is ovoid, conical, pale yellow white; roots is fleshy and roots tubers is ovoid and white inside. Leaves is distichous and broadly ovate, base slightly cordate, petiole is equal to lamina, ligule is short, inflorescence is both central and lateral. Flower is 4.5 cm long, 1 or 2 in each bract. Lateral staminodes is oblong, yellow purple towards the base. Anther thecae is parallel, yellow spurred. Ovary is trilocular, densely pubescent, style long, filliform, stigma bilipped. Fruit is ovoid and hairy. Seeds is oblong, brown with a white spot at the tip, aril white, lacerate.

Distribution:

C. decipiens is mostly found in Peninsular India, South west India, North East India, Andaman and Nicobar Island (Sabu, 2006).

It is also found in West Godavari District of Andhra Pradesh, Pallakad district of Kerala, Amravati district and Thane district of Maharashtra.

Medicinal Importance:

The rhizomes are crushed and made into paste and is used in the treatment of cough, cold, boil and for allergy (Rao and Lamo, 2017) (Figure 3.1, G).

H. *Curcuma longa L.*

Vernacular name: Shynrai

Morphological Description:

C. longa is 3-5 tall plants with a short stem and is a sterile plant with no seeds. The rhizome is an underground stem that is thick, oblong, ovate, pyriform and fleshy ringed with the base of old leaves.

Its rhizomes are the source of a bright yellow spice and dye. Leaves are large and oblong and up to 1 m long, dark green on upper surface and pale green beneath. Each leafy shoot (Pseudo stem) bears 8 -12 leaves.

Flower is yellow white and borne on a spike like stalk, they are sterile and do not produce viable seeds.

Description:

It is mostly found in a tropical climate and in countries such as China, East Africa, West Africa, Jamaica and in India it is found in Andhra Pradesh, Tamil nadu, Orrisa, Karnataka, West Bengal, Gujarat, Meghalaya, Maharashtra and Assam.

Medicinal Importance:

The rhizome is crush and make into a paste and used in fracture toe nail, it is also used for stomach ache, blood purifier, cold, vermicide, antiseptic, antiperiodic, diabetes, leprosy, sore throat.

It is also known for its anti-inflammatory, antibacterial, antifungal, antiviral, antiplate, anticoagulant, antiallergic, anti-asthmatic, anti-diabetic and wound healing activity, strengthen the body, rheumatism, sinusitis etc (Reddy et al., 2011; Rao and Lamo, 2017) (Figure 3.1, H).

I. *Curcuma Montana Roxb*

Vernacular name: Sying

Morphological Description:

Rhizome is pale yellow, bitter in taste and camphoraceous. Leaf sheath is purple. Leaves are oblong-lanceolate, green and glabrous. Inflorescence is either lateral or terminal. Coma bracts are white with light purple streak towards the top. Fertile bracts are green and are fused at the base on which a cincinnus of flowers are borne. Corolla is white and the labellum is yellow. Presence of anthers spurs.

Distribution:

C. Montana is distributed in the Indian subcontinent and is found in Kerala, Karnataka, Chennai, Andhra Pradesh, Eastern Himalayas, North East region and particularly in Meghalaya.

Medicinal Importance:

The juice of *C. Montana* mixed with Kaempferia galanga is used to facilitate delivery in women during childbirth (Koh et al., 2009).The rhizomes is boil in water along with the roots and leaves of Acorus calamus and about 1-2 teaspoon of this decoction is given to the expecting mothers (Hynniewta and Kumar, 2010; Rao and Lamo, 2017) (Figure 1, I).

J. *Kaempferia galanga L.*

Vernacular name: Sying kmoh

Morphological Description:

K. galanga is a perennial aromatic herb with a very fragrant underground parts, leaves is spreading flat on the ground and is two or more round ovate, thin, deep, green, petioles very short, channelled, flowers white with purplish spots in the axillary fascicles, corolla tubes 2.5 cm long, connective of anther produced in to a quadrate two lobed appendage, fruits oblong and seeds arillate.

The underground rhizome has one or more prominent, vertically oriented tuberous root stock and many small secondary tubers and roots, their tips becoming tuberous.

Distribution:

K. galanga is native to Indonesia, Southern China, Taiwan, Cambodia, Bangladesh, Myanmar, Sri Lanka, Japan, Vietnam, Nigeria, South Africa and in India it is mostly found in Karnataka, Kerala, Tamil Nadu, West Bengal and in Northeast state like Meghalaya, Manipur and Mizoram.

Medicinal Importance:

K. galanga forms a component of over 59 ayurvedic medicines and is extensively used in the preparation of ayurvedic drugs, perfumery, cosmetics and as a spice ingredients. It is used for the treatment of diarrhoea, migraine and it increases energy to overcome exhaustion and is a constituents of variety of ayurvedic preparations.

The rhizomes and root stocks are thermogenic, acrid, carminative, aromatic, depurative, diuretic, expectorant, digestive, vulnerary, antihelmentic, febrifuge and stimulant. They are good for dyspepsia, leprosy, skin disease, rheumatism, asthma, cough, bronchitis, wounds, ulcers, helminthiasis, fever, malaria, splenopathy, inflammatory tumour, nasal obstructions and haemorrhoids.

Rhizome is taken orally against poisoning, when there is blood vomiting. In infants, the rhizomes is applied for mouth sores and tongue blisters (Preetha et al., 2016) (Figure 3.1, J).

K. *Kaempferia rotunda L.*

Vernacular name: Sying smoh

Morphological Description:

Rhizome is short, stout and strongly aromatic, roots is stout, fleshy, often terminating in ovoid or spindle shaped, leaves are few, radical, erect, lamina, oblong, lanceolate with acute base and gradually acuminate apex, purple beneath, upper surface glabrous, lower surface densely cover with very short hairs, ligule small and hairy. Inflorescence appearing before the leaves, shortly peduncle, enclosed within greenish purple, narrow sheath. Flower is purple, aromatic and spike (Joy et al., 2016).

Distribution:

K. rotunda is native to china and Indian subcontinent including Assam, Meghalaya, Nepal and Bangladesh. It is also found in Malaysia and Costa Rica, Sri Lanka, Myanmar, Thailand and Vietnam.

Medicinal Importance:

The rhizome is used for stress related stomach trouble and as general tonic. The flowers contain the toxin benzyl benzoate which is used to make the ointments to treat scabies. Tubers are widely used as an application for tumours, swellings and wounds. It also removed blood clot and other impurities from the body, improves complexion and cures burning sensation, mental disorders and insomnia.

The juice of the tubers is given in dropsical affections of hands and feet and of effusions in joints. The tubers in decoction form is applied with much benefits to wounds with coagulated blood and with any purulent matter (Joy et al., 1998) (Figure 3.1, K).

L. Zingiber Rubens Roxb.

Vernacular name: Sying makhir

Morphological Description:

Z. Rubens leafy stems grows up to 6 feet tall. Flowers arise from the base of the rhizome with the inflorescence almost embedded on the growing substrate. A short stalk carries the inflorescence with tightly packed bright red bracts.

Single flowers emerge from within the bracts. Flowers have a showy patterned lip. The seed capsules are bright red. Stem dies down and rhizomes remain underground and only the bright red seeds capsules are visible.

Distribution:

Z. Rubens is mostly found in South East Asia and in India it is found in Assam, Meghalaya, Gujarat, Madhya Pradesh, Kerala, West Bengal, Andhra Pradesh.

Medicinal Importance:

The rhizome powder of Z. Rubens is mixed with ripe Morinda citrifolia for the treatment of severe pain, the cooked and softened rhizome is used to treat tooth ache, cough, asthma, worms, leprosy and other skin diseases. The ground and strain rhizome is mixed with water to treat stomach ache. The tuber is also used in bone setting. The rhizome is also used for the treatment of malaria (Figure 3.1, L).

M. Zingiber zerumbets Sm.

Vernacular name: Sying blei

Morphological Description:

Z. zerumbets is an herbaceous perennial plant producing clumps of leaves from a large rhizome. The leaves form a pseudostem, the flowers is of conical or club shaped and its head burst forth on separate and short stalk and when it's mature they gradually fill in with aromatic, slimy liquid and turn into brighter red colour.

The flower stalks usually remain hidden beneath the leaf stalks. The inflorescence is green when young and red when old. Fruit is white and glabrous. The seeds are ellipsoid and black.

Distribution:

Z. zerumbets is native to Asia and Australia, it is also found in Vietnam, Malaysia, Bangladesh, China, Thailand. In India it is mostly found in Assam, Meghalaya and Odisha.

Medicinal Importance:

Z. zerumbets rhizomes is used in the treatment of inflammation, fever, toothache, indigestion, constipation, diarrhoea, severe sprains and to relieve pains as well as antispasmodic, antirheumatic and diuretic agents. It is also used for the cure of edema, stomach ache, sores and loss of appetite while the juice of the boil rhizomes is used to treat worm infestation in children.

The cooked and softened rhizome is used to treat toothache, cough, asthma, worms, leprosy and other skin diseases and the ground and strain rhizomes is mixed with water and drank to treat stomach ache.

The leaves is crushed and made into paste and are used as remedy for cuts and bruised skin and it is also crush with salt to treat headache (Figure 3.1, M).

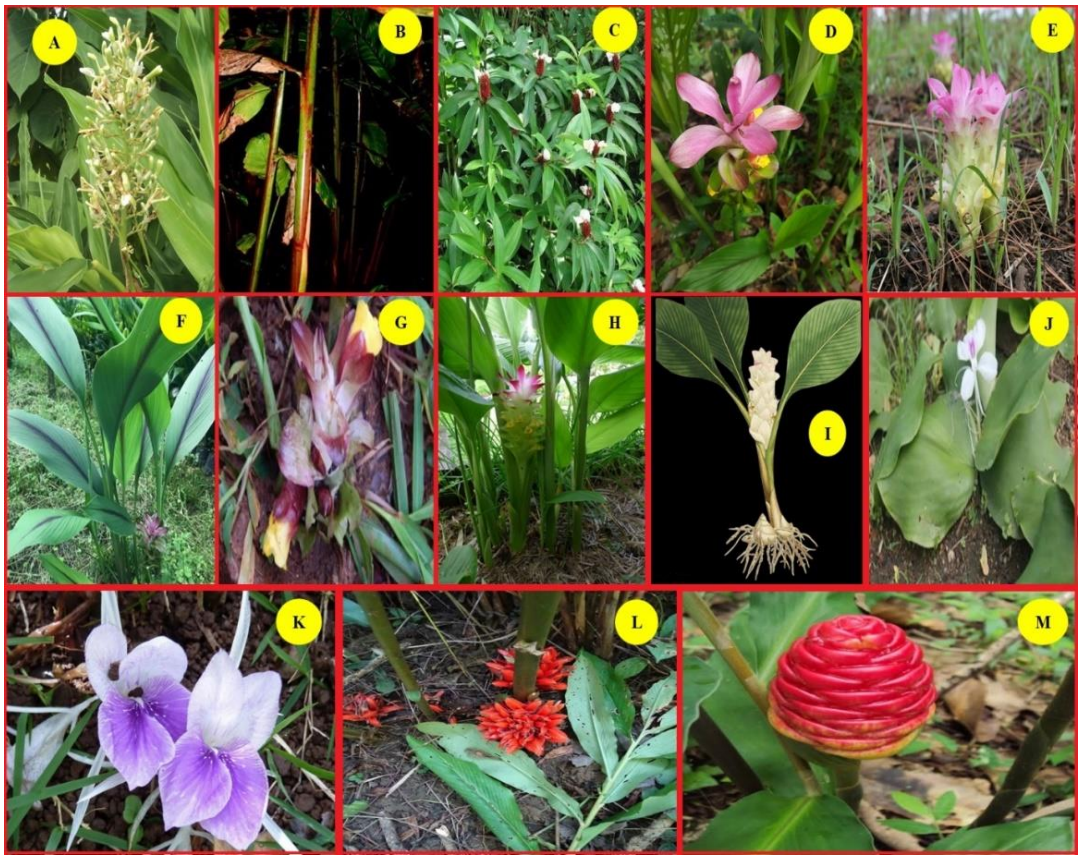

Figure 3.1: Members of Zingeberaceae with distribution in Meghalaya: **A:** *Alpinia galanga* (L) Swartz**; B:** *Ammomum aromaticum* Roxb**; C:** *Costus speciosus* J. Konig ex Retz Smith**; D:** *Curcuma aeruginosa* Roxb**; E:** *Curcuma angustifolia* Roxb**; F:** *Curcuma caesia* Roxb**; G:** *Curcuma decipiens* Dalzell**; H:** *Curcuma longa* L.**; I:** *Curcuma Montana* Roxb**; J:** *Kaempferia galanga* L.**; K;** *Kaempferia rotunda* L.**; L:** *Zingiber rubens* Roxb.**; M:** *Zingiber zerumbets* Sm**.**

3.4 Conclusion:

The chapter presented here dealt with the morphological description, distribution pattern and important medicinal properties of the zingiberaceae family plants of Meghalaya.

It is a comprehensive account and especially the medicinal importance of these zingiberaceae family plants that are found in Meghalaya, India. The information provided here will be useful as a concrete support for future experimental studies on members of zingiberaceae with distribution in Meghalaya.

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